



This document contains the Comprehensive Conservation and Management Plan for Narragansett Bay, December 1992: Goals, Issues, Objectives, and Strategies.

The report (narragansett_ccmp_pt4.pdf) can be downloaded from:

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715-03 GOALS

The five goal statements listed below have been adopted by the Narragansett Bay Project (NBP) in order to guide future efforts to protect and restore Narragansett Bay.

Statement of the Goals for Restoring and Protecting Narragansett Bay

1. The State of Rhode Island and the Commonwealth of Massachusetts, in conjunction with the Federal government and the municipalities, should act to prevent further degradation and incrementally improve water quality in developing coastal areas with deteriorating water quality.
2. The State of Rhode Island and the Commonwealth of Massachusetts, in conjunction with the Federal government and the municipalities, should act to protect diminishing high quality critical resource areas throughout the Bay basin.
3. The State of Rhode Island and the Commonwealth of Massachusetts, in conjunction with the Federal government, should act to more effectively manage commercially, recreationally, and ecologically important estuarine-dependent living resources.
4. The State of Rhode Island and the Commonwealth of Massachusetts, in conjunction with the Federal government and the municipalities, should act to rehabilitate degraded waters throughout the Bay basin and restore water quality-dependent uses of Narragansett Bay.
5. The State of Rhode Island and the Commonwealth of Massachusetts, in conjunction with the Federal government and the municipalities, should establish necessary interstate and interagency agreements and mechanisms to coordinate and oversee implementation of the Narragansett Bay Comprehensive Conservation and Management Plan.

The Narragansett Bay goal statements mirror the overall goal of the EPA's National Estuary Program, which is to: "...restore and maintain the chemical, physical and biological integrity of the estuary, including restoration and maintenance of water quality, a balanced indigenous population of shellfish, fish and wildlife, and recreational activities in the estuary, and assure that the designated uses of the estuary are protected."

More specifically, however, the goals for protecting and restoring Narragansett Bay evolved from the NBP Management Committee's original list of "issues of concern", which are as follows:

- Impacts of toxic pollutants,
- Impacts of nutrients and eutrophication,
- Land-based impacts on water and habitat quality,
- Health and abundance of living resources,
- Fisheries management,
- Health risk to consumers of seafood, and
- Environmental impacts on commercial and recreational uses of Narragansett Bay.

Since the NBP's entire research and planning effort focussed on these identified "issues of concern", the goals for the protection and restoration of Narragansett Bay also reflect the NBP's

increasingly sophisticated understanding of the relationship between human activities throughout the Bay basin and the ultimate public health, environmental and ecological consequences for Narragansett Bay. As a result, the goal statements listed above integrate the NBP planning community's understanding of the problems facing Narragansett Bay with its collective judgment about technological, institutional, political, and economic factors affecting eventual *CCMP* implementation. However, it is extremely important to read these goal statements within the context of the entire *CCMP*. The agencies responsible for *CCMP* implementation, and the public, should continuously measure their progress in implementing the recommendations contained in Parts 715-04 and 715-05 of the *CCMP* against these goals for protecting and restoring Narragansett Bay.

715-04 ISSUES, OBJECTIVES, AND STRATEGIES

In conformance with Section 320 of the federal Clean Water Act, the overall goal of the Narragansett Bay *Comprehensive Conservation and Management Plan (CCMP)* is to:

"...recommend priority corrective actions and compliance schedules addressing point and nonpoint sources of pollution to restore and maintain the chemical, physical and biological integrity of the estuary, including restoration and maintenance of water quality, a balanced indigenous population of shellfish, fish and wildlife, and recreational activities in the estuary, and assure that the designated uses of the estuary are protected."

Part 715-04, therefore, represents the core of the Narragansett Bay *CCMP*. Each chapter establishes a resource-related objective, and recommends detailed strategies for resolving a specific aspect of an identified environmental "issue of concern" for Narragansett Bay. The overall "issues of concern" for Narragansett Bay, as identified by the Narragansett Bay Project's governing committees in 1985-86, are as follows:

- Impacts of toxic pollutants,
- Impacts of nutrients and eutrophication,
- Land-based impacts on water and habitat quality,
- Health and abundance of living resources,
- Fisheries management,
- Health risk to consumers of seafood, and
- Environmental impacts on commercial and recreational uses of Narragansett Bay.

These general "issues of concern" dictated the scope of the NBP's entire \$10 million research and planning effort since 1985. As a result, this part of the *CCMP* is based on the most contemporary scientific, social, legal and economic information available to the Narragansett Bay planning community as of 1991, including over 100 technical reports and 15 briefing papers commissioned and

published by the NBP between 1985 and 1992. [See Bibliography and Appendix C.] All of these chapters were refereed by the NBP Management Committee and outside reviewers. In addition, many of these chapters were developed in consultation with representatives of affected Bay constituencies. [See 715-01-04 Process of Plan Development.] Part 715-04 of the Narragansett Bay *CCMP*, therefore, represents the planning community's best collective judgment about strategies for addressing the sources, and environmental and use-related consequences of identified Bay problems.

Since many interrelated anthropogenic activities contribute to observed Bay problems, Part 715-04 is divided into three sections: Source Control - Source Reduction (715-04-01); Resource Protection (715-04-02); and Areas of Special Concern (715-04-03). Section 715-04-01 (Source Control - Source Reduction) addresses major classes of pollutants (e.g., toxics and nutrients); and major pollutant sources and pollutant pathways (e.g., wastewater treatment facilities, combined sewer overflows, on-site sewage disposal systems, boater discharges, nonpoint pollution sources). Section 715-04-02 (Resource Management) focuses on human uses of the land and natural resources that affect the integrity, function and human use of the Bay ecosystem. Section 715-04-03 (Areas of Special Concern) addresses specific geographic regions of the Bay basin which require an integrated approach to address pollution, resource management and use-related concerns.

These chapters attempt to be objective and comprehensive with respect to existing environmental and use impairments, predicted environmental trends, and recommended strategies. However, the research community's understanding of basic estuarine processes and human interactions with the environment is not complete. [See Section 715-05-05 Unfinished Agenda.] In addition, the planning and regulatory community's ability to manipulate the environment and predict the outcome is also limited—partially by the lack of appropriate technology and/or

legal authority, partially by limited resources, and partially by fragmented geographic and/or subject matter jurisdiction. [See Section 715-05-02 *CCMP* Implementation and Governance.] As a result, the recommendations presented in Part 715-04 reflect existing scientific uncertainty about the Bay ecosystem, available technological and regulatory solutions, and the complexity of the existing structure of Bay governance. Therefore, implementing authorities and interested readers should use these chapters recognizing that the scientific community's understanding of Bay problems is continually improving, and that technological and regulatory solutions are continually evolving.

04-01 Source Control-Source Reduction

The Narragansett Bay basin has been continuously inhabited by humans for over 10,000 years. However, the earliest evidence of serious water quality and natural resource problems date from the colonial period, and are associated with population growth, modification of the landscape, and industrialization. Water quality in some limited regions of the Bay basin has improved in recent decades, primarily because of the large public investment in water pollution control technology, and most conspicuously in the Providence River. However, other near-coastal areas and tributaries show signs of deteriorating water quality and increasing impairment of water quality-dependent uses related to the trend toward suburbanization and development of rural areas of the Bay watershed.

Section 715-04-01 focuses on reducing current inputs of human fecal waste, toxic pollutants, and nutrients in order to restore threatened and degraded waters, and to restore water quality-dependent uses of the Bay. In addition, a combination of regulatory controls and non-regulatory, economic incentives are recommended in order to reduce future inputs of polluting substances associated with projected increases in population growth and development in the Bay basin. The Section also addresses significant pollutant sources and pollutant pathways (*i.e.*, combined sewer overflows, on-site sewage disposal systems, boater discharges, and nonpoint sources) responsible for discharging multiple classes of pollutants.

04-01-01 Source Reduction: Toxics

Objective for the Reduction of Toxics Inputs

The State of Rhode Island and the Commonwealth of Massachusetts should eliminate the discharge or release of toxic pollutants to the environment, from all sources, in order to protect public health and safety; the integrity of air, land and water resources; the health of aquatic and terrestrial plants and animals, and other economically viable uses of natural resources.

Introduction

The term "toxics", for the purposes of this discussion, refers to heavy metals and organic chemicals that may produce adverse human health or ecological effects when introduced into the environment at toxic levels. Human (or 'anthropogenic') sources of toxic pollutants to the Narragansett Bay basin include industrial, commercial and household wastes; agricultural and lawn chemicals; motor vehicle emissions and leaks; accidental releases and deliberate disposal.

The pathways by which toxic pollutants enter Narragansett Bay include rivers, publicly owned wastewater treatment facilities (WWTF), combined sewer overflows (CSO), direct industrial discharges, urban, highway and lawn runoff, groundwater discharge to surface waters, atmospheric deposition, and remobilization of contaminated sediments (Penniman *et al.*, 1991a).

Statement of the Problem

Although the metals and some of the organics occur naturally in low concentrations, they can accumulate in the tissues of plants and animals, causing physiological damage or death at elevated concentrations. On the other hand, synthetic organic chemicals, such as polychlorinated biphenyls (PCB) and chlorinated pesticides, often persist in the environment and can cause biological harm at low concentrations (Penniman *et al.*, 1991a:1).

Ambient concentrations of metals may be derived from the weathering of mineral de-

posits, or anthropogenically (and at toxic levels) from metal finishing and electroplating industry discharges and emissions, improper disposal of factory and domestic wastes, corrosion of copper and lead pipes, boat antifouling paints, *etc.* Toxic organic chemicals enter the Bay from the burning of fossil fuels, industrial and domestic discharges of organic solvents, chronic small chemical releases and from catastrophic spills, such as the *World Prodigy* spill of #2 heating oil in 1989. Many forms of toxic pollutants adsorb to particles that eventually settle to the bottom of the Bay, resulting in their accumulation in the sediments or tissues of marine organisms (Penniman *et al.*, 1991a:2). Others remain in solution, depending on temperature, salinity, pH, and chemical reactivity.

Biological Effects

Marine organisms, including fish and shellfish, can accumulate toxics in their tissues from the sediments and water to which they are exposed, and by consuming food that contains toxic pollutants. The effects of this accumulation can be both acute and chronic for organisms exposed to elevated contaminant levels. Acute toxicity, including death and population disruption, can occur in cases of extreme or persistent exposure to toxics. For example, lobster, mussel, benthic invertebrate and plankton kills in the intertidal and shallow subtidal areas heavily fouled by the *World Prodigy* oil spill represent an acute biological response to an extreme exposure to toxic petroleum derivatives (Pilson, 1990).

Sublethal exposures to toxic pollutants can cause carcinogenic, mutagenic and behavioral effects, organic tissue damage, general reduction in organism fitness and ability to reproduce, and change in community stability (Jeon and Oviatt, 1991; Penniman, 1991a). Elevated toxics levels in edible tissues of harvested seafood can also pose human health risks. For example, neurological disorders and an increased risk of cancer may be caused by chronic exposures to seafood contaminated with toxics (Kipp, 1990; Penniman *et al.*, 1991a:2-3). [See 04-02-04

Resource Protection: Public Health for further discussion.]

Temporal and Spatial Distribution

Chemical profiles from sediment cores show marked increases in metals' concentrations that coincide with the beginning of industrialization in the Narragansett Bay basin (Corbin, 1989; King, 1991; Penniman *et al.*, 1991a). The magnitude and environmental effect of industrial inputs have varied over time, however, due to changes in manufacturing, dam construction on tributaries, interception of industrial discharges to municipal sewers, improvements in wastewater treatment and industrial pretreatment technologies, as well as changes in disposal strategies for municipal sewage sludge (Penniman *et al.*, 1991a:1). For example, there is convincing evidence that significant reductions in inputs of some metals to the Providence River have occurred since the 1970s (King, 1991; Bender *et al.* 1989; Penniman *et al.*, 1991a:4). These reductions correspond to reductions in metals loadings to municipal WWTFs, changes in the metal finishing industry and reduction in use of leaded gasoline (Penniman *et al.*, 1991a:4).

Toxic metal and organic pollutant concentrations in Bay waters and sediments generally decrease along a down-bay gradient from the Providence and Seekonk Rivers to Rhode Island Sound (Doering *et al.*, 1989; Vandal and Fitzgerald, 1988; Bender *et al.*, 1989; Pilson and Hunt, 1989; Nixon, 1991; Metcalf & Eddy, Inc., 1991a). This gradient reflects distance from industrial and urban centers as well as Bay circulation patterns, depositional gradients and contaminant reactivity with seawater and suspended solids. Although total metals loadings to upper Narragansett Bay have decreased significantly in recent years (Penniman *et al.*, 1991a:5), marine aquatic life criteria for copper, nickel, and occasionally lead are still exceeded in the Providence and Seekonk Rivers. In addition, freshwater aquatic life criteria for copper, nickel, lead, chromium, cadmium, and polychlorinated biphenyls are persistently exceeded in segments of the Blackstone, Pawtuxet, Woonasquatucket, and Moshassuck Rivers and localized tox-

ics' "hot spots" still exist in other areas of the Bay basin related to local municipal, industrial, commercial, agricultural, and defense activities (Penniman *et al.*, 1991a:5).

Existing Policies

Discharges and releases of toxic metals and organic chemicals to the environment are regulated under a variety of federal laws, including the Clean Water Act (CWA), the Resource Conservation and Recovery Act (RCRA), the Clean Air Act (CAA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and the Toxic Substances Control Act (TSCA). Discharges to freshwater and marine receiving waters are regulated under the CWA via the National Pollutant Discharge Elimination System (NPDES) and, indirectly via the National Pretreatment Program (NPP). Permitting authority may be delegated to the states for administration of both programs as is the case for Rhode Island (Penniman *et al.*, 1991a:10).

In addition, both Rhode Island and Massachusetts have established non-regulatory programs for reducing industrial discharges of toxics to the environment. These programs are described below. The State and the Commonwealth also participate, along with other New England states, and the States of New York and New Jersey, in the Northeast Waste Management Officials' Association (NEWMOA), which focuses on exchanging information regarding pollution prevention strategies (Penniman *et al.*, 1991a:15).

Water Quality Criteria

The Clean Water Act requires states to adopt water quality standards to protect public health, aquatic resources, and designated uses of state waters. These standards define the level of ambient water quality that must be achieved to support desired uses of the waterbody. Discharges into receiving waters are regulated, therefore, to ensure compliance with state water quality standards and protect designated uses of the state's waters.

In setting water quality standards, two sets of criteria are considered: aquatic life criteria and human health criteria. Aquatic life criteria are based on toxicity of specific chemicals to test animals. The U.S. Environmental Protection Agency (EPA) has developed aquatic life criteria for 30 toxic pollutants. Human health criteria, on the other hand, are based on toxic chemical concentrations in the tissues of edible organisms that could result in unacceptable, adverse health effects to human consumers, based on risk assessment analyses (Kipp, 1990). The EPA has developed human health criteria for 108 toxic pollutants.

Massachusetts has recently adopted, by reference, both aquatic life and human health criteria. Rhode Island has adopted criteria for the protection of aquatic life and is currently promulgating criteria for the protection of human health. However, some differences exist between Rhode Island and Massachusetts with respect to the designated uses and water quality standards of shared waterbodies such as Mount Hope Bay and the Blackstone River (Penniman *et al.*, 1991a:11).

Regulation of Discharges to Receiving Waters

In Rhode Island, the EPA has delegated primary authority for administering the NPDES permit program to the state, which issues "RIPDES" permits. The Rhode Island Pollutant Discharge Elimination System or RIPDES permits (and NPDES permits in Massachusetts, a "non-delegated" state) set effluent discharge limits for direct municipal and industrial wastewater dischargers to protect receiving water quality. Permit requirements typically include effluent monitoring, chemical toxicity testing, and periodic priority pollutant scans. Monthly monitoring and quarterly noncompliance reports are submitted to the state and EPA Region I. Failure to comply with permit limits or monitoring and reporting requirements is considered a violation of the Clean Water Act (and state water quality protection laws) and subject to enforcement action. The Rhode Island Department of Environmental Management (RIDEM) is primarily respon-

sible for permitting and enforcement in Rhode Island. In Massachusetts, NPDES permits are issued and enforced jointly by EPA and the Massachusetts Department of Environmental Protection (MADEP) (Penniman *et al.*, 1991a:10).

RIDEM regulates 129 direct dischargers to Narragansett Bay via RIPDES permits, 25 of which are "major" permittees based on flow, effluent, and receiving water characteristics. There are 116 permittees in the Massachusetts portion of Narragansett Bay watershed; 34 in the Blackstone River basin, 56 in the Taunton River basin and 15 along the Ten Mile River. Thirty-six of the Massachusetts dischargers are classified as "major" (Penniman *et al.*, 1991a:13).

Pursuant to the National Pretreatment Program (NPP), industrial discharges to WWTFs are regulated by local WWTFs under state and/or EPA supervision. WWTFs, or "local control authorities", issue enforceable discharge permits to industrial users that specify industry-specific effluent limits, general prohibitions on discharging materials that may adversely affect worker health or WWTF operation, and local limits that reflect the WWTF's own RIPDES (NPDES) permit limits, operating requirements, and/or receiving water quality standards. (Penniman *et al.*, 1991a:14)

In Rhode Island, the EPA has delegated supervisory responsibility for industrial pretreatment programs to the state, and administrative responsibilities to the WWTFs. Thirteen of Rhode Island's 19 WWTFs have established industrial pretreatment programs as of 1991. In Massachusetts, these responsibilities are delegated directly to the WWTFs (as opposed to the Commonwealth), subject to EPA oversight. Seven of the 17 Massachusetts WWTFs in the Narragansett Bay basin have industrial pretreatment programs as of 1991 (Penniman *et al.*, 1991a:14).

Source Reduction

Rhode Island has established several programs that focus on reducing the use and release of toxic pollutants to the environment ("pollution prevention") rather than end-of-

pipe regulation. Two Rhode Island laws specifically address reducing the discharge or disposal of toxic wastes. The Hazardous Waste Reduction, Recycling, and Treatment Research and Demonstration Act of 1986 (R.I.G.L. 23-19.10-1 *et seq.*) provides grants and low interest loans to industry for the development and demonstration of waste reduction and recycling technologies. The Hard-to-Dispose Material—Control and Recycling Act of 1989 (R.I.G.L. 37-15.1-1 *et seq.*) levies a surcharge on "hard-to-dispose" materials, such as organic solvents, oil, antifreeze, batteries, *etc.*, in order to encourage recycling and decrease use of hazardous materials (Penniman *et al.*, 1991a:15). These programs are administered by the RIDEM Office of Environmental Coordination's Hazardous Waste Reduction Program (HWRP). The HWRP also performs waste reduction assessments for Rhode Island industries, recommends more effective waste minimization practices, and tracks cost savings achieved by industries that implement pollution prevention practices (Penniman *et al.*, 1991a:16).

Other waste reduction programs in Rhode Island include the statewide *Capacity Assurance Plan* which will update waste reduction targets for hazardous wastes, including metals, and develop disposal strategies to account for the total volume of hazardous waste generated in Rhode Island; and EPA's Industrial Toxics Project, under which the state has agreed to work with industry to reduce total environmental releases of 17 pollutants by as much as 50 percent by 1995 (Penniman *et al.*, 1991a:16). The RIDEM also participates in a newly-created coalition of government, environmental groups, and industry representatives called the Rhode Island Pollution Prevention Council (RIPPC). The RIPCC is developing economic and regulatory incentives to increase source reduction, identifying markets for recycled materials, recommending priorities for research and development, and coordinating educational and technical assistance efforts (Penniman *et al.*, 1991a:16-17).

The Commonwealth of Massachusetts has initiated comparable source reduction pro-

grams. The Massachusetts Toxics Use Reduction Act, enacted in 1990, calls for a 50 percent reduction in toxic waste produced statewide by 1997 and emphasizes source reduction as opposed to end-of-pipe permitting to achieve this goal (Penniman *et al.*, 1991a:17). In addition, Massachusetts established the experimental Blackstone Project in 1989 to provide technical assistance to industries along the Commonwealth's portion of the Blackstone River. The Blackstone Project also works with state regulatory agencies to test the feasibility of regulating a facility's entire manufacturing process under a single consolidated discharge permit with respect to discharges, releases, and off-site transfers of toxics to all media (Penniman *et al.*, 1991a:17).

Analysis

At present, the most serious water quality degradation related to toxic pollutants occurs in the Providence River and its major tributaries—the Blackstone, Pawtuxet, Woonasquatucket, Moshassuck, and Ten Mile Rivers. However, elevated concentrations of some toxic substances also occur in other less urban areas of the Bay. For example, elevated mercury concentrations have been measured in Mount Hope Bay sediments, and sediment cores recently collected from the center of Greenwich Bay and Apponaug Cove show recent copper concentrations at five to 20 times above pre-Colonial levels. In addition, copper levels in Greenwich Bay have decreased by only five to ten percent compared to 67 percent in the Seekonk River over the same time period (King, 1991; Penniman *et al.* 1991a:4). Importantly, mussel tissue samples collected from relatively clean sites in Narragansett Bay (near Spar Island in Mount Hope Bay) were found to be the sixth most contaminated of 72 sites in the United States for copper and the eighth most contaminated of 145 estuaries sampled for lead (NOAA, 1987). Based on these findings, the use and discharge of toxics substances should be reduced throughout the Bay watershed.

Federal and state regulations governing the use, discharge, emission, and off-site waste transfer of toxic materials focus on indus-

trial sources and are administered according to the environmental medium (air, land, water) that receives the waste. This regulatory approach may inadvertently 1) create incentives for shifting toxic wastes to other media in response to changing regulatory requirements; 2) create inconsistent or redundant regulatory requirements; 3) discourage development and testing of new treatment technologies; and 4) confound the agencies' ability to measure progress in achieving net reductions in toxics loadings to the environment. Existing regulatory policies may also inadvertently create incentives for industrial users to relocate away from highly regulated urban areas to areas with inadequate infrastructure (water, sewer) and/or less stringent regulatory requirements.

As noted above, toxic substances enter the Narragansett Bay watershed via a variety of pathways and derive from numerous natural and anthropogenic sources. WWTFs, followed by rivers, are the major pathways for the discharge of toxics to Narragansett Bay, although both receive wastes from direct (*e.g.*, industry, households) and indirect or nonpoint (*e.g.*, contaminated groundwater, runoff) pollutant sources. Since Rhode Island's Industrial Pretreatment Program, in combination with industry efforts, has resulted in significant reductions in industrial toxics loadings to WWTFs, up to 40 percent of the total metals discharged to the Narragansett Bay Commission (NBC) Field's Point facility at the present time could derive from non-industrial sources, including residential and commercial dischargers, corrosion of water supply conveyance systems, contaminated groundwater and runoff (Metcalf & Eddy, 1990a). Therefore, as industry continues to reduce its use and disposal of toxics, non-industrial sources such as commercial, agricultural, municipal and domestic users of toxic chemicals (including fossil fuels), urban and highway runoff, and groundwater discharge to surface waters may represent an increasingly significant contribution of toxics throughout the Bay basin.

Finally, human health and aquatic life criteria presently exist for a small subset of the

chemical compounds that are potentially of concern in marine systems. An even smaller subset of these anthropogenically-produced pollutants are presently controlled through the regulatory permit process—many WWTFs in the Narragansett Bay basin do not have effluent metals limits and even fewer have organic chemical limits (Penniman *et al.*, 1991a:17). However, there are numerous industrial, commercial, agricultural, and domestic sources of these non-regulated chemicals in the Narragansett Bay basin, and the regulatory problem may become increasingly serious in the future as new industries with "exotic" wastestreams, *e.g.*, bioengineering and pharmaceutical companies, become established. Consequently, source reduction and regulatory strategies should be developed that apply to a broader spectrum of potentially toxic chemicals rather than addressing only those toxic substances for which local data are available.

In summary, the existing trend toward industrial source reduction offers great potential for overall, permanent reductions in toxics loadings to upper Narragansett Bay. However, toxics-related problems in the Narragansett Bay basin are not limited to a single geographic region, a single category of users or a small group of toxic compounds. As a result, both regulatory and non-regulatory approaches should be evaluated in order to achieve basin-wide reductions in toxics use and discharge to the Bay.

Recommended Policies and Actions and *Estimated Cost of Implementation* are presented in the following pages.

RECOMMENDED POLICIES AND ACTIONS **SOURCE REDUCTION: TOXICS**

CODE	POLICY	AGENCIES	STATUS
I.	The State of Rhode Island and the Commonwealth of Massachusetts should reduce total toxics loadings to Narragansett Bay basin from all sources by maximizing conservation of natural resources and minimizing the use, generation, and discharge of toxics to the environment.		
I.A.	Comprehensive Regulation of Toxics		
I.A.1.a.	<p>The U.S. Environmental Protection Agency (EPA), the State of Rhode Island, and the Commonwealth of Massachusetts should assure that inconsistent, unclear or inappropriate regulatory policies and requirements do not create unnecessary impediments to achieving source reduction or reductions in toxics loadings to the environment. In order to implement this recommendation, the EPA, the Rhode Island Department of Environmental Management (RIDEM) and Massachusetts counterparts should prepare a report within one year following approval of the Narragansett Bay <i>Comprehensive Conservation and Management Plan (CCMP)</i> that evaluates potential conflicts among regulations pertaining to toxic pollutants, and formulates strategies to resolve identified conflicts. On an ongoing basis, these agencies should publish summary explanations of policies and/or regulations identified by interagency advisory groups as possibly interfering with progress toward source reduction. EPA Region I should appoint a single individual to receive notification and coordinate responses to federal policies or regulations that have been so identified. Examples of regulatory and program requirements that should be reviewed include:</p> <ul style="list-style-type: none"> i. The Resource Conservation and Recovery Act (RCRA) permitting and reporting requirements regarding "hazardous waste treatment" that have been construed to apply to industries that install <i>zero discharge</i> recycling systems. ii. Federal and state discharge requirements that have been construed to apply to pilot scale research and development projects. iii. Federal program requirements that have been construed to prohibit the issuance of facility-based permits and consolidation of reporting requirements. 	EPA, RIDEM, MADEP, NEWMOAA, RIPPC, Local control authorities	RIPPC, NEWMOAA, and R.I. local control authorities have identified several possible conflicts.

✓ - High Priority Action

RECOMMENDED POLICIES AND ACTIONS
SOURCE REDUCTION: TOXICS

CODE	POLICY	AGENCIES	STATUS
I.A.1.b.	The EPA, the State of Rhode Island and the Commonwealth of Massachusetts should continue to participate in interagency pollution prevention advisory groups that review regulations and regulatory programs, recommend pollution prevention strategies and goals, review scientific and technological advances, exchange information on new technologies, and act as a liaison to industry.	EPA, RIDEM, MADEP, MADEM	[See RIDEM "Preliminary Agreement," Section 715-05-06.]
I.A.1.c.	The Commonwealth of Massachusetts should hire a Massachusetts Pretreatment Coordinator to act as a liaison with other states, local control authorities, and interagency pollution prevention advisory groups as soon as possible.	MADEP and/or MADEM	[See RIDEM "Preliminary Agreement," Section 715-05-06.]
I.A.2.	To assure that waste minimization practices and best available technologies (BATs) are used wherever practicable to minimize cross-media transfer of toxic chemical wastes, the EPA, RIDEM, and Massachusetts counterparts should encourage better training of program staff in all aspects of toxic materials regulation. These agencies should: a. Provide regulatory staff with continuing education in the municipal, industrial and manufacturing processes they regulate. b. Train regulatory staff to conduct coordinated, facility-wide inspections for all discharges, releases, and off-site transfers of regulated wastes.	EPA, RIDEM, MADEP, MADEM	[See RIDEM "Preliminary Agreement," Section 715-05-06.]
I.A.3.	a. The State of Rhode Island should be included on EPA Region I, Massachusetts Department of Environmental Protection (MADEP), and Massachusetts Coastal Zone Management (MACZM) lists of automatic reviewers of Massachusetts' discharge permits within the Narragansett Bay basin. b. The State of Rhode Island should be included on EPA Region I, Massachusetts Department of Environmental Protection (MADEP), and Massachusetts Coastal Zone Management (MACZM) lists of automatic reviewers of Massachusetts' water withdrawal permits within the Narragansett Bay basin. c. RIDEM, the Rhode Island Coastal Resources Management Program (CRMC) and the Rhode Island Division of Planning (RIDOP) should identify appropriate agency contacts to receive notice and provide reviews consistent with their jurisdiction and mandates under Coastal Zone Management Act Section 307, Executive Order 12372 and other sources of federal consistency review authority.	EPA, MADEP, MACZM, RIDEM, CRMC, RIDOP	

✓ - High Priority Action

RECOMMENDED POLICIES AND ACTIONS
SOURCE REDUCTION: TOXICS

CODE	POLICY	AGENCIES	STATUS
I.A.4. ✓	<p>To the fullest extent of their authority, the EPA, RIDEM, and MADEP should require all regulated municipal and industrial dischargers to minimize the use, generation, and disposal of toxic substances to the maximum extent practicable. In order to implement this recommendation:</p> <p>a. The EPA should develop a waste minimization report form that consolidates the requirements of the <i>Capacity Assurance Plan</i> (RIDEM, 1989a) and the <i>Rhode Island Hazardous Waste Reduction and Reporting Manual</i> (Center for Environmental Studies, 1989).</p> <p>b. By December 1995, the EPA and RIDEM should, to the fullest extent of their authority, require the completion of a waste minimization report by all significant industrial users subject to industrial pretreatment program requirements and should incorporate relevant portions of waste minimization plans into discharge permits, including schedules for implementing pollution prevention and toxics use reduction practices. The RIDEM should provide affected dischargers with assistance in completing the waste minimization report form to be developed by the EPA in order to educate and train industry personnel and improve compliance with regulatory requirements.</p> <p>c. The EPA, RIDEM, MADEP, and local control authorities, to the maximum extent possible, should revise existing industrial pretreatment regulations to require all significant industrial users found to be in significant noncompliance with industrial pretreatment discharge standards to undergo a formal on-site waste reduction assessment, and to submit a waste minimization report. The waste minimization report should establish short-term (three to five years) and long-term (greater than five years) goals for source reduction and treatment options and should quantitatively report actual reductions in use and disposal of toxics in all media, biennially, for the next five years. ["Significant noncompliance" is defined in 40 CFR § 403.8 (f) (2) (vii) (A) (B) for the purposes of this recommendation.]</p> <p>d. The federal government, the State of Rhode Island, and the Commonwealth of Massachusetts should establish economic incentives to encourage private investment in research, development, and implementation of pollution reduction technologies. (See Rec. IE)</p>	EPA, RIDEM, MADEP	[See RIDEM "Preliminary Agreement," Section 715-05-06. re: possible revision to Industrial Pretreatment regulations, the R.I. Clean Air Act, and the R.I. Hazardous Waste Mgt. Act re: waste reduction assessments and waste minimization reports.]

✓ - High Priority Action

**RECOMMENDED POLICIES AND ACTIONS
SOURCE REDUCTION: TOXICS**

CODE	POLICY	AGENCIES	STATUS
I.B.	WWTFs and Direct Industrial Dischargers		
I.B.1.	The EPA, RIDEM, and MADEP should effectively regulate direct toxic pollutant discharges to Narragansett Bay and its tributaries. In order to implement this recommendation:		
I.B.1.a. ✓	The EPA, RIDEM, and Massachusetts counterparts should establish a basin-wide <i>Narragansett Bay List of Toxics of Concern</i> . The list should be based on documented exceedances of human health and aquatic life criteria anywhere in the Bay basin, all compounds regulated in existing permits, and best professional judgment of agency personnel. Based on existing information, the following chemicals should be included on the <i>List</i> : cadmium, chromium, copper, lead, mercury, nickel, zinc, cyanide, total petroleum hydrocarbons (PHC), polyaromatic hydrocarbons (PAH), and polychlorinated biphenyls (PCB).	EPA, RIDEM, MADEP, RIDOH, MADPH	[See RIDEM "Preliminary Agreement," Section 715-05-06.]
I.B.1.b. ✓	<p>The EPA, RIDEM, and MADEP should issue National Pollutant Discharge Elimination System/Rhode Island Pollutant Discharge Elimination System (NPDES/RIPDES) permits to wastewater treatment facilities (WWTF) and direct industrial dischargers that are presently operating under expired permits, and, to the extent allowed by current regulations, revise existing permits to include effluent limits for all toxic metal and organic pollutants of concern in the Narragansett Bay basin sufficient to achieve water quality standards.</p> <p>i. The following NPDES/RIPDES discharge permits have expired and should be reissued as soon as possible: Douglas (Mass.), Upper Blackstone Water Pollution Abatement District (Mass.), Narragansett Bay Commission Field's Point (R.I.), Narragansett Bay Commission Bucklin Point (R.I.), and Woonsocket (R.I.), Smithfield (R.I.) and Warren (R.I.).</p> <p>ii. To the extent allowed by current regulations, the following NPDES discharge permits should be revised as soon as possible to include enforceable numeric, chemical-specific effluent limits for all metal and organic chemicals of concern: Grafton (Mass.), Hopedale (Mass.), Millbury (Mass.), and Uxbridge (Mass.).</p>	EPA, RIDEM, MADEP	Smithfield RIPDES permit issued 1992; Draft NBC Bucklin Point RIPDES permit issued Dec. 31, 1990; Draft NBC Field's Point RIPDES permit issued June 1992.

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I.B.1.c.	By December 1993, the EPA, RIDEM (or RIDOE), and MADEP should cooperatively perform a metals wasteload allocation for the Blackstone-Seekonk-Providence River basin and Upper Narragansett Bay in order to identify waters and sediments impaired by metals, and develop individual control strategies for identified point source dischargers. NPDES/RIPDES permits with enforceable, numeric, chemical-specific effluent limits, revised to the extent allowed by current regulations, shall be issued to all dischargers in the affected basin within two years following completion of the waste load allocation.	EPA, RIDEM, MADEP	Dryweather survey completed Summer 1991. [See EPA Region I and RIDEM "Preliminary Agreements," Section 715-05-06. re: commitment to wet weather survey, WLA.]
I.B.2.	The EPA, RIDEM, and MADEP should effectively measure direct toxic pollutant discharges to Narragansett Bay and its tributaries in order to allow systematic comparisons of temporal and spatial trends in pollutant loadings and receiving water quality. To the fullest extent of their authority, the EPA, RIDEM, and MADEP should: a. Require all dischargers subject to NPDES/RIPDES permits in the Narragansett Bay basin to routinely report monthly influent and effluent concentrations and loadings of all permitted toxic pollutants on the <i>Narragansett Bay List of Toxics of Concern</i> ; and b. Implement a receiving water monitoring program that is adequate to determine compliance with federal and state water quality standards, and evaluate regional trends in water quality. [See 05-02-04 CCMP Implementation and Governance: Long-Term Monitoring for related recommendation.]	EPA, RIDEM, MADEP	

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I.B.3 ✓	<p>The EPA, RIDEM and MADEP should effectively enforce limitations on direct toxic pollutant discharges to Narragansett Bay and its tributaries. These agencies should take the following actions to increase compliance with existing discharge requirements:</p> <ul style="list-style-type: none"> a. Increase the frequency of unannounced on-site inspections and compliance monitoring at all WWTFs and direct industrial dischargers. b. Take timely and appropriate enforcement action for persistent noncompliance (more than three consecutive months) with chemical-specific effluent and toxicity limits, including monetary penalties that remove all benefits of noncompliance. c. Require WWTFs and businesses found to be in significant noncompliance with NPDES or RIPDES permits to publish notices in newspapers of general circulation identifying the violation, the penalty, and measures taken to prevent future violations. <p>["Significant noncompliance" is defined in EPA Quality Noncompliance Report Workshop, December 1985 for the purposes of this recommendation.]</p>	EPA, RIDEM, MADEP	[See EPA Region I and RIDEM "Preliminary Agreements," Section 715-05-06 re: inspection and enforcement.]
I.B.4.	<p>In order to increase compliance with existing discharge and other permit requirements, Rhode Island and Massachusetts state agencies should seek legislative expansion of federal and state "citizen suit" jurisdiction under the Clean Water Act (CWA), RCRA, Clean Air Act (CAA), Toxic Substances Control Act (TSCA), and state equivalents, as necessary to provide legal standing to citizen "watchdog" organizations to enforce, where applicable, all permit requirements regarding toxics discharges, releases, and off-site waste transfers to all media. In addition, state agencies should seek to establish federal and state "citizen suit" jurisdiction under the CZMA, Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and state implementing programs.</p>	RIDEM, CRMC, Mass. counterparts	

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I.C.	Industrial Users		
I.C.1.	<p>The EPA, RIDEM, and local control authorities, including their Massachusetts counterparts, should verify, on an ongoing basis, that all industrial users subject to industrial pretreatment requirements are operating pursuant to discharge permits. In order to ensure that Massachusetts, Rhode Island, and local regulators are covering all industrial sources:</p> <p>a. Facilities files maintained by local control authorities and regulatory divisions of RIDEM and Massachusetts counterparts should be compared.</p> <p>b. Water use records should be examined for evidence of above-average water consumption in residential areas to detect unregulated manufacturing operations.</p> <p>c. Records of the Rhode Island Department of Economic Development and its Massachusetts counterpart, tax records, and all other appropriate public records listing manufacturing firms registered in Rhode Island and Massachusetts [SIC codes 20 to 39] should be examined.</p> <p>d. The State of Rhode Island and Commonwealth of Massachusetts should <i>not</i> offer a one-time amnesty for presently unregulated businesses to comply voluntarily with federal and state permitting requirements for wastewater, solid or hazardous waste disposal, and air emissions.</p>	EPA, RIDEM, MADEP, local control authorities	RIDEM reviews W W T F Industrial Pretreatment program operations annually.

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I.C.2. ✓	<p>In order to reduce the rate of noncompliance with industrial pretreatment program requirements, the EPA, RIDEM, local control authorities, and their Massachusetts counterparts should rigorously enforce industry compliance with existing industrial pretreatment program requirements, including all chemical-specific and toxicity-based discharge limits, and monitoring and reporting requirements. ["Significant noncompliance" is defined in 40 CFR § 403.8 (f) (2) (vii) (A) (B) for the purposes of this recommendation.] In order to implement this recommendation:</p> <p>a. RIDEM and MADEP should require training and/or certification for municipal industrial pretreatment program staff, including inspectors and industry personnel charged with overseeing industrial wastewater pretreatment operations.</p> <p>b. These agencies should take timely and appropriate administrative, civil, and criminal enforcement action against all regulated industrial dischargers found to be in significant noncompliance with chemical-specific effluent and toxicity limits, as defined in 40 CFR § 403.8 (f) (2) (vii) (A) (B), including monetary penalties that remove all benefits of noncompliance, and jail sentences for principals of firms found to be in violation of criminal provisions of the industrial pretreatment program requirements.</p> <p>c. All regulated industrial dischargers found to be in significant noncompliance with federal, state, and local discharge limitations, as defined in 40 CFR § 403.8 (f) (2) (vii) (A) (B), should be required to publish notices in newspapers of general circulation identifying the violation(s), the penalty, and measures taken to prevent future violations.</p> <p>d. Within the limits of their jurisdiction, a "whistle-blower" statute should be drafted, or existing statutory authority amended, to reward individuals who provide information regarding industries that are presently operating without required regulatory oversight. This statute should be patterned after federal "whistle-blower" measures and should include job-protection provisions.</p> <p>e. These agencies should formally review the administration and enforcement of any industrial pretreatment program where more than or equal to 15 percent of the regulated industries are in significant noncompliance with program requirements.</p>	EPA, RIDEM, MADEP, local control authorities	[See RIDEM and EPA Region I "Preliminary Agreements," Section 715-05-06 re: enforcement and audits of Industrial Pretreatment programs.]

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I.C.3. ✓	<p>The EPA, RIDEM, local control authorities, and their Massachusetts counterparts should systematically encourage regulated industrial dischargers to use and implement source reduction practices. In order to implement this recommendation, these agencies should:</p> <p>a. To the fullest extent of their authority, require completion of a waste minimization report by all significant industrial users subject to Industrial Pretreatment Program requirements; and revise existing industrial pretreatment regulations to require all dischargers found to be in significant noncompliance with industrial pretreatment standards, as defined in 40 CFR § 403.8 (f) (2) (vii) (A) (B), to receive a complete, on-site waste reduction assessment. [See Recommendation LA.4.]</p> <p>b. Require certified design drawings of source reduction, reclaim, and recycle plans to be submitted as a requirement of the permitting process. Design drawings should be certified by a registered Professional Engineer or any individual formally approved by either the State Board of Registration for Professional Engineers or RIDEM to certify industrial process design drawings.</p> <p>c. Require industry-wide implementation of proven, affordable technologies or processes that reduce the use or generation of toxic pollutants without shifting waste to another medium, (e.g., the use of substitutions for chlorinated and/or fluorinated degreasers), unless an industry can demonstrate that an equally effective alternative exists.</p> <p>d. Pending clarification of RIDEM's authority, the RIDEM should implement the requirements of the Chemical Purchasing Act of 1990 (R.I.G.L. 42-110), as amended, to assure that companies that purchase restricted chemicals are licensed by RIDEM based, in part, on the company's spill contingency plans and permit compliance record.</p>	EPA, RIDEM, MADEP, local control authorities	[See EPA Region I and RIDEM "Preliminary Agreements," Section 715-05-06 re: emphasis on source reduction.]

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I.C.4.	<p>Within two years following approval of the <i>CCMP</i>, the EPA should authorize, establish, and oversee pilot facility-based permitting projects in both Rhode Island and Massachusetts to test procedures for streamlining the permitting process and achieving overall reductions in pollutant loadings to all environmental media, <i>i.e.</i>, each participating industrial user should receive a single permit covering discharges, releases, and off-site waste transfers to all media rather than separate permits for dischargers to air, land, and water. Within one year following completion of the demonstration project the EPA should:</p> <ul style="list-style-type: none"> a. Prepare a written evaluation of the administrative and regulatory success of the pilot projects, including the Blackstone Project, compared to conventional regulation of industrial dischargers. b. Determine whether the pilot project should be expanded, modified, or discontinued. c. Identify sections of relevant federal and state statutes and regulations that would have to be amended to allow complete implementation of facility-based permitting. 	EPA	[See EPA Region I "Preliminary Agreement," Section 715-05-06 re: technical assistance to states on whole facility permitting.]

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I.D.	Other Generators of Toxic Pollutants		
I.D.1.	In order to measure adequately and to begin regulating non- industrial sources of toxic pollutants:		
I.D.1.a.	The RIDEM, local control authorities, and their Massachusetts counterparts, with technical assistance provided by EPA, should expand the categories of commercial enterprises subject to industrial pretreatment program requirements to include any discharger that discharges more than 500 gallons per day of mixed sanitary and process wastewater or generates more than ten kilograms per month or one 55-gallon drum per year of hazardous waste. [Activities to be considered include, but are not limited to, auto body shops, hospital, dental, medical, and photo laboratories, and dry cleaners.] All other commercial enterprises that discharge directly to sewers or generate septage that is ultimately discharged to a WWTF should be evaluated for inclusion in pretreatment programs by December 1995. These policies should be consistently implemented on a watershed-wide basis. The following policies should also be implemented as soon as possible:	RIDEM, MADEP, EPA, local control authorities	[See EPA Region I "Preliminary Agreement," Section 715-05-06 re: technical assistance to local control authorities for expansion of Industrial Pretreatment Program.]
I.D.1.a.i.	The establishment of enforceable pretreatment standards for toxic metals and organic chemicals in septage, and enforcement of existing state prohibitions on the discharge of non-domestic waste to on-site sewage disposal systems (OSDS). RIDEM and its Massachusetts counterparts should consider requiring an annual report from non-residential property owners served by OSDSs regarding manufacturing and service activities on-site that result in any discharge to the OSDS.	RIDEM, Mass. counterpart	
I.D.1.a.ii.	The expansion of existing household toxic waste collection, recycling, and disposal centers to allow collection of wastes generated by <i>tiny-quantity waste handlers</i> on a cost-recovery basis. The EPA, RIDEM, and Massachusetts counterparts should review their regulations to assure that unnecessary regulatory impediments to proper waste collection, recycling and disposal are modified or removed. [For the purpose of this recommendation, <i>tiny quantity waste handlers</i> are defined as "individuals or small businesses that produce less than ten kg per month, or less than one 55 gallon drum per year, of hazardous waste" (Roque, 1991), and are <u>not</u> subject to State hazardous waste or industrial pretreatment program requirements.]	EPA, RIDEM, Mass. counterpart	

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I.D.1.a. iii.	The reinstitution of the RIDEM household toxic waste collection, recycling, and disposal program as soon as possible. The RIDEM should evaluate alternative financing options to institute this program permanently.	RIDEM	RIDEM re-instituted program in 1992 and is seeking permanent funding
I.D.1.b.	The State of Rhode Island and Commonwealth of Massachusetts should require more rigorous annual motor vehicle inspections for air emissions and fluid leaks, including oil leaks, and should link annual motor vehicle registration fees and/or State excise taxes to EPA-rated gasoline mileage in order to promote the use of gasoline efficient vehicles. The State of Rhode Island and Commonwealth of Massachusetts should develop public education materials regarding the environmental effects of chronic oil leaks and highway runoff.	R.I. and Mass.	R.I. House Bill #8589 (1992) will require RIDEM to promulgate vehicle emission regulations, if passed.
I.D.1.c.	On an ongoing basis and within the limits of their jurisdiction, the EPA, the State of Rhode Island, the Commonwealth of Massachusetts, and consumer groups should make every reasonable effort to reduce household use of toxics by: i. Identifying environmentally safe substitutes for commonly used household chemicals. ii. Assessing "hard to dispose" taxes on household products containing toxic metals or organic chemicals. Revenues generated by the "hard to dispose tax" should be deposited in a RIDEM restricted receipt account and dedicated to future source reduction efforts in the State of Rhode Island. iii. Providing options for safe collection, recycling, and disposal, where possible, for household products containing toxic metals or organic chemicals, including oil. iv. Reducing the use of products containing chemicals in amounts that could be toxic to humans or aquatic life, or will interfere with WWTF processes or sludge disposal.	EPA, RIDEM, MADEP, MADEM, consumer groups, environmental advocacy groups	

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I.E.	Economic Incentives and Disincentives		
I.E.1.	<p>The federal government, including the EPA, the State of Rhode Island, and the Commonwealth of Massachusetts should develop and apply market incentives for toxics that make wasteful or environmentally unsound use and disposal practices expensive. For example:</p> <p>a. Rhode Island and Massachusetts should adjust existing water rate structures to remove subsidies and encourage conservation, <i>i.e.</i>, by establishing use fees that increase with the volume of water consumed. [Note, legislation encouraging water conservation and recommending inclining block rates for water use was passed by the Rhode Island General Assembly in 1991, amending R.I.G.L. 46-15.4.]</p> <p>b. Local control authorities in Rhode Island and Massachusetts should assess discharge fees on industrial wastewater discharges based on volume, pollutant loading, toxicity and/or receiving water quality, <i>e.g.</i>, 50 percent of the fee charged based on the volume of discharge and 50 percent charged based on loadings of conventional and toxic pollutants in the wastestream.</p> <p>c. Rhode Island and Massachusetts should tax raw materials and/or products that are either individually toxic or are toxic in combination with other materials in order to promote conservation and recycling, <i>e.g.</i>, Rhode Island's "Hard to Dispose Materials" Act of 1989, Massachusetts "Toxic Use Reduction Act".</p> <p>d. Massachusetts should establish a deposit-refund system on items such as batteries, automobile tires, <i>etc.</i>, modeled after Rhode Island's "Battery Deposit and Control Act," in order to discourage improper disposal.</p> <p>e. Rhode Island and Massachusetts should actively inform the public about health and environmental risks associated with pollutant discharges and the industrial, commercial, and agricultural use of chemicals by advertising the existence of federal and state <i>Community Right to Know</i> resources.</p>	EPA, R.I., Mass., local control authorities	[See RIDEP, RIDOH "Preliminary Agreements," Section 715-05-06 re: enforcement of water conservation measures in Water Supply Management Act (1991).]

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I.E.2.	<p>The federal government, including the EPA, and the State of Rhode Island, and Commonwealth of Massachusetts should encourage and reward private investment in pollution-reduction technologies. In addition, new regulatory initiatives regarding the mandatory use of BATs should be coupled with financial assistance programs to the extent possible in order to facilitate industry conversion to pollution reduction technologies. For example:</p> <p>a. Rhode Island and Massachusetts should consider offering tax credits to industries that are in compliance with their discharge permits and can document reductions of greater than or equal to 25 percent in discharges, releases, and off-site transfers of toxics relative to 1989 levels. The tax credit should reward source reduction initiatives and should not compensate for reduced production. The amount of the tax credit should be proportional to actual reductions in use and disposal achieved.</p> <p>b. Public interest groups and government agencies, within the limit of their authority, should promote environmentally safe products and/or develop a "Seal of Approval" for products of environmentally-sound manufacturing processes. Relevant federal and state authorities should develop regulations to govern the marketing of products as "environmentally safe." [See Rhode Island's "Waste Recycling" Act that provides for the adoption of a "distinctive logo to identify materials that are composed of recycled materials, recyclable materials or which are packaged in a source-reduced manner" (R.I.G.L. 23-18.8-3)].</p> <p>c. Rhode Island and Massachusetts should establish and maintain a state-funded, low-interest revolving loan fund to stimulate research and development into new technologies and waste reducing processes, and to enable qualified small-to-medium-size businesses to invest in pollution control technology. Grants should be available to support research and development. Loans should be available to enable qualified companies to invest in proven technologies. [Note: Rhode Island enacted the "Hazardous Waste Reduction, Recycling, and Treatment Research and Demonstration Act of 1986" with a \$2 million appropriation for these purposes.]</p>	EPA, R.I., Mass.	<p>R.I. Hazardous Waste Demonstration Act bond fund (1986) has \$1.5 million remaining as of 3/92; R.I. Aqua Fund bond fund (1989) has \$3.8 million remaining as of 3/92 as grants and low interest loans for industry.</p>

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I.E.3.	<p>The federal government, including the EPA, the State of Rhode Island, and the Commonwealth of Massachusetts should protect the states' economic welfare and environmental integrity by promoting the development of <i>green</i> business. For example:</p> <p>a. Rhode Island and Massachusetts should establish <i>small business incubators</i>, in conjunction with universities and the private sector, to provide capital, research, and marketing support to promote the development of commercially viable <i>green</i> technologies and products. [The incubators would provide</p> <ul style="list-style-type: none"> i) Low-interest loans to small manufacturing concerns in reclaimed and recycled materials, products manufactured from reclaimed or recycled materials, or innovative production or waste treatment technologies; ii) research facility assistance for developing innovative processes and/or products; iii) governmental assistance in processing necessary permits; iv) private assistance in marketing or private investment.] <p>b. Rhode Island and Massachusetts should foster markets for reclaimed and recycled materials as well as for products manufactured from reclaimed and recycled materials. Rhode Island and Massachusetts should consider adopting legislation requiring the state government to purchase products manufactured from reclaimed and recycled materials, if available, and to the extent that agency budgets are adjusted accordingly.</p> <p>c. To the extent permitted by federal and state law, trade organizations in Rhode Island and Massachusetts should be encouraged to consider pooling resources to purchase raw materials, shared equipment, and contractual services, to reduce the amount of hazardous materials in inventory, and to achieve economies of scale that would improve the region's competitive advantage. The EPA, RIDEM, and MADEP should work with trade organizations to identify appropriate areas for pooling resources.</p> <p>d. Rhode Island and Massachusetts should require imported manufactured goods to meet the same federal and state production standards as locally-produced goods, or label country or state of origin.</p>	EPA, R.I., Mass., industry trade organizations, industry	

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I.F.	Information Exchange and Technology Transfer		
I.F.1.	<p>The EPA and the State of Rhode Island should continue to provide financial support to the Rhode Island Hazardous Waste Reduction Program (HWRP). Similar technical assistance and clearinghouse programs should continue to be supported in Massachusetts. The technical assistance programs should:</p> <p>b. Establish procedures within industry to promote environmentally protective, cost-effective technologies and conservation measures, <i>e.g.</i>, see the HWRP's "quality circle" approach.</p> <p>c. Encourage industry and professional trade organizations to share the experiences of <i>home-grown</i> source reduction techniques.</p> <p>d. Organize demonstrations by consultants and vendors of new pretreatment and source reduction technologies. In addition, the Rhode Island Pollution Prevention Council (RIPPC) and/or the HWRP should establish a <i>Technology Review Board</i> to review emerging pollution reduction technologies.</p> <p>e. Provide waste reduction assessment services for large, medium, and small businesses that are significant industrial users subject to industrial pretreatment standards in order to identify cost-effective managerial, manufacturing, pretreatment and disposal options that will, if implemented, result in a net reduction in use of natural resources and toxics discharge.</p> <p>f. Work with government, industry, and academia to test full scale <i>demonstration models</i> of experimental production or pretreatment processes in working Rhode Island plants.</p> <p>g. Assist and work with regulators to develop standardized monitoring, reporting, permitting, and inspection procedures.</p>	EPA, R.I., Mass., HWRP, RIPPC, Mass. counterparts	RIDEM HWRP receives ongoing state support for these activities. [See RIDEM "Preliminary Agreement," Section 715-05-06 re: cooperative agreement with URI to test experimental source reduction techniques in R.I. businesses.]

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I.G.	Treatment		
I.G.1.	To achieve net reductions and to prevent cross-media transfers of pollutants, all source reduction options should be considered <i>before</i> considering treatment for removal of toxics from a municipal, industrial, or commercial wastestream. The EPA, RIDEM, and Massachusetts counterparts should, however, follow developments in chemical, biological, and/or physical technologies for the degradation of toxic compounds into environmentally safe forms.	EPA, RIDEM, MADEP	
I.G.2.	The State of Rhode Island and the Commonwealth of Massachusetts should establish and maintain a state-funded low interest revolving loan fund to enable qualified small to medium size businesses to invest in proven source reduction technologies. Grants should be available to stimulate and support research and development.	R.I., Mass.	R.I. Hazardous Waste Demonstration Act and Aqua Fund bond funds have over \$5 million remaining but temporarily frozen (1992).
II.	The State of Rhode Island and the Commonwealth of Massachusetts should make every reasonable effort to reduce industrial emissions, discharges and off-site waste transfers of the following chemicals to 50 percent of 1989 levels by 1995: cadmium, chromium, copper, lead, mercury, nickel, silver, zinc, cyanide and their compounds.		
II.A.	The EPA, RIDEM, and Massachusetts counterparts should establish numeric, water quality-based effluent limits for cadmium, chromium, copper, nickel, lead, mercury, silver, and zinc for all WWTFs operating in the Bay watershed that 1) have identified sources of these metals in their service areas, and/or 2) contribute to violations of public health or aquatic life criteria for these metals.	EPA, RIDEM, MADEP	

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II.B.	<p>As part of their triennial review of water quality regulations, RIDEM and MADEP should evaluate whether existing water quality criteria for cadmium, chromium, copper, nickel, lead, mercury, silver, and zinc are appropriate based on evidence of toxicity, bioaccumulation, water quality or habitat degradation, or existing or desired uses of the waterbody, and determine whether site-specific human health or aquatic life criteria should be developed for these compounds.</p> <ol style="list-style-type: none"> 1. In no case shall an existing aquatic life criterion be relaxed for any waterbody or segment of the waterbody unless the RIDEM or MADEP, with EPA approval, demonstrates that the pollutant in question does not contribute to observed toxicity, bioaccumulation, water quality or habitat degradation, or limitations on existing or desired uses of the waterbody. 2. In no case shall site-specific criteria developed for a limited segment of a waterbody be extrapolated to another waterbody without an explicit comparison of their hydrologic, ecological, and physiographic conditions. 3. In no case shall public funds be used to assist a non-governmental entity to develop site-specific criteria. 	RIDEM, MADEP, EPA	The UBWPAD is evaluating use of site-specific criteria for Upper Blackstone (1992).
II.C.	<p>The RIDEM, local control authorities, and Massachusetts counterparts should require regulated industries throughout the Narragansett Bay basin to use the best available technology (BAT) to reduce the use, generation, release and disposal of cadmium, chromium, copper, nickel, lead, mercury, silver, zinc, and cyanide. (For the purpose of this recommendation, BAT shall be defined as a practicably available, proven technology or process that can achieve the most stringent limits currently in use within the watershed.) The requirement to use BAT should be implemented independently of "local limits" established by a state or local control authority in order to: a) develop uniform incentives for source reduction, b) remove competitive advantages resulting entirely from differing regulatory requirements, and c) remove economic and regulatory incentives for industries to locate or relocate in the basins of relatively uncontaminated receiving waters in order to take advantage of less stringent "local limits".</p>	RIDEM, MADEP, local control authorities, EPA	

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II.D.	To the fullest extent of their authority, the EPA, RIDEM, local control authorities, and Massachusetts counterparts should require all industrial dischargers subject to industrial pretreatment program requirements to file a waste minimization report by 1995 that sets short-term (three- to five-year) goals for reducing discharges, releases and off-site transfers of cadmium, chromium, copper, nickel, lead, mercury, silver, zinc, cyanide and related compounds. Industrial dischargers that can document reductions in loadings before 1989 should receive credit for reductions already achieved.	EPA, RIDEM, MADEP, local control authorities	[See RIDEM "Preliminary Agreement," Section 715-05-06.]
II.E. ✓	The EPA, RIDEM, HWRP, and Massachusetts counterparts should emphasize raw material substitution techniques, modifications of standard manufacturing processes, and best-available technological processes for reducing industrial use and/or discharge to the wastestream of cadmium, chromium, copper, nickel, lead, mercury, silver, zinc, and cyanide.	EPA, RIDEM, HWRP, Mass. counterparts	
II.F.	Where copper or lead concentrations in the water supply are identified as important background sources of total copper or lead, the RIDEM, the Rhode Island Department of Health (RIDOH), and their Massachusetts counterparts shall require the water supply authorities to reduce copper or lead concentrations by reducing or eliminating corrosion of the conveyance system, eliminating the use of copper-based algaecides, and/or eliminating any anthropogenic inputs of copper or lead into the water supply, as appropriate.	EPA, RIDEM, RIDOH, Mass. counterparts	[See RIDOH "Preliminary Agreement," Section 715-05-06 re: enforcement of Safe Drinking Water Act requirements for copper, lead.]
II.G.	The State of Rhode Island and Commonwealth of Massachusetts should condition the use of copper-based herbicides to treat human-induced eutrophication of surface waters tributary to Narragansett Bay on the submittal of a management plan that addresses the feasibility of alternative control measures, including septic system repair or replacement, vegetative buffers, stormwater controls, density controls, and other land management options. In addition: 1. The EPA should make every effort to reconcile requirements of the Safe Drinking Water Act and the Clean Water Act with regard to human health and aquatic life criteria for copper. 2. The State of Rhode Island and Commonwealth of Massachusetts should discourage the use of copper-based herbicides on surface waters tributary to Narragansett Bay.	EPA, USDA, RIDEM, CRMC, Mass. counterparts	

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III.	The State of Rhode Island and the Commonwealth of Massachusetts should make every reasonable effort to reduce industrial emissions, discharges and off-site waste transfer of the following chemicals to 50 percent of 1989 levels by 1995: benzene, carbon tetrachloride, chloroform, dichloromethane, dioxin, methyl ethyl ketone, methyl isobutyl ketone, tetrachloroethylene, toluene, trichloroethylene, xylenes, 1,1,1,-trichloroethane.		
III.A.	Industry trade organizations should endorse the RIDEM's effort to encourage voluntary industry participation in meeting the toxics reductions targeted in the EPA's <i>Industrial Toxics</i> ("33/50") Project. To evaluate the state's success in meeting the targeted reductions, toxics loadings should be quantitatively measured and reported. Massachusetts should be encouraged to participate voluntarily in the <i>Industrial Toxics</i> ("33/50") Project.	RIDEM, Mass. counterparts, industry	
IV.	The State of Rhode Island and the Commonwealth of Massachusetts should make every reasonable effort to reduce industrial discharges, releases, including accidental releases, and off-site waste transfers of the following chemicals to 50 percent of 1989 levels by 1995: petroleum hydrocarbons (PHC) and polycyclic aromatic hydrocarbons (PAH).		
IV.A.	By December 1993, the EPA and/or the U.S. Food and Drug Administration (FDA) should develop national aquatic life criteria and human health criteria, including action levels for human consumption of seafood, for PHCs and PAHs.	EPA, FDA	

✓ - High Priority Action

RECOMMENDED POLICIES AND ACTIONS
SOURCE REDUCTION: TOXICS

CODE	POLICY	AGENCIES	STATUS
IV.B.	<p>The EPA, the Federal Highway Administration (FHWA), the State of Rhode Island, and the Commonwealth of Massachusetts should undertake the following actions to reduce motor vehicle-related discharges, releases and emissions of PHCs and PAHs to the Narragansett Bay basin:</p> <ol style="list-style-type: none"> 1. The State of Rhode Island and the Commonwealth of Massachusetts should emphasize pollution prevention as the preferred long-term strategy for reducing petroleum inputs to Narragansett Bay. Pollution prevention measures could include more rigorous regulation of air emissions and motor vehicle fluid leaks, and incentives to encourage the use of fuel efficient motor vehicles, mass transit, and alternatives to fossil fuels. 2. The FHWA, the State of Rhode Island and the Commonwealth of Massachusetts should require the use of best management practices (BMP) as an absolute condition of new road construction or major upgrades where any road drainage would otherwise be discharged to Narragansett Bay or its tributaries. The state Departments of Transportation should use BMPs identified by EPA and the states' Section 319 and 6217 Nonpoint Source Management Programs until the FHWA promulgates new guidelines consistent with the 1991 Internal Surface Transportation Efficiency Act. 3. The FHWA, EPA, and state Departments of Transportation should support additional research into the design of BMPs to capture and treat road runoff consistent with the mandate of the 1991 Internal Surface Transportation Efficiency Act. 	EPA, FHWA, RIDEM, RIDOT, CRMC, Mass. counterparts	[See "Preliminary Agreements," Section 715-05-06; RIDEM re: promulgation of vehicle emission regulations; USDA SCS re: provision of site inspection services to RIDOT; Mass Conservation Districts.] R.I. received \$13 million "demonstration" grant from FHWA for runoff abatement projects on I-95 and other coastal highways draining to Narragansett Bay. Non-federal match of \$3.6 million required.

✓ - High Priority Action

**RECOMMENDED POLICIES AND ACTIONS
SOURCE REDUCTION: TOXICS**

CODE	POLICY	AGENCIES	STATUS
IV.C.	<p>The federal government, the State of Rhode Island and the Commonwealth of Massachusetts should make every reasonable effort to reduce the risk of accidental marine spills of petroleum products and other chemicals in Narragansett Bay and its tributaries. Implementation efforts should include:</p> <ol style="list-style-type: none"> 1. Development of appropriate federal and state legislation governing tanker hull design, use of satellite navigation in Rhode Island waters, and the professional qualifications and use of pilots in Rhode Island waters. 2. Establishing State causes of action and remedies for spill-related harm to the public's interest in natural resources, including the cost of restoring natural habitats and living resources. 3. Development of appropriate federal and state regulations to: <ol style="list-style-type: none"> a. govern fuel hose fittings on vessels and marine facilities with fueling stations; b. require all marine facilities with fueling stations to have formal plans to deal with accidental oil or gasoline spills; and c. require all marine facilities with fueling stations to maintain spill containment equipment on site, and provide trained personnel to implement spill containment measures. 4. Preparing, as soon as possible, updated <i>Oil Spill Contingency Plans</i> for emergency spill response and environmental damage assessment, with provisions for responding to oil and chemical spills related to the bulk storage of chemicals in the floodplain of Narragansett Bay, near Bay tributaries, and within the Narragansett Bay watershed. 5. Design, engineering, and deployment of tailored oil booms for critical areas such as tidal creeks and rivers, salt marshes, coves, and developed harbors. 	U.S. Congress, EPA, R.I., Mass.	[See RIDEM "Preliminary Agreement," Section 715-05-06 re: update of <i>Oil Spill Contingency Plan</i> .]
IV.D.	The State of Rhode Island and Commonwealth of Massachusetts, in conjunction with local governments, should provide continuing support for local facilities to collect waste oil from homeowners' automobiles and boats.		

✓ - High Priority Action

RECOMMENDED POLICIES AND ACTIONS
SOURCE REDUCTION: TOXICS

CODE	POLICY	AGENCIES	STATUS
V.	Within two years following approval of the <i>CCMP</i> , the EPA, U.S. Department of Agriculture (USDA), RIDEM, and their Massachusetts counterparts shall review existing guidelines governing the use of pesticides and herbicides in the Narragansett Bay basin and recommend revised regulations or requirements, as necessary.		
V.A.	Within one year following approval of the <i>CCMP</i> , the EPA, USDA, RIDEM, and their Massachusetts counterparts should prepare a preliminary survey of the areal extent, magnitude, and ecological and public health risk associated with pesticide and herbicide use (including both commercial and over-the-counter sources) in the Narragansett Bay basin. Existing data should be used to the maximum extent possible.	USDA, EPA, RIDEM, Mass. counterparts	[See USDA SCS "Preliminary Agreement," Section 715-05-06 re: pesticide use survey.]
V.B.	Within one year following approval of the <i>CCMP</i> , the State of Rhode Island and Commonwealth of Massachusetts should prepare a comprehensive survey of pesticide and herbicide use in the Narragansett Bay basin, including name, active ingredient(s), method of application, and target species for each chemical; type and number of users; amount of each chemical used per unit area based on land use type; and total amount of each chemical used per year.	RIDEM, Mass. counterparts	[See USDA SCS "Preliminary Agreement," Section 715-05-06 re: pesticide use survey.]
V.C.	The USDA Soil Conservation Service and affiliated Cooperative Extension Programs should increase assistance to farmers in planning for pest management and develop homeowner programs to reduce the use of pesticides.	USDA, Coop. Extension	[See USDA SCS "Preliminary Agreement," Section 715-05-06 re: pest management, pesticide labeling.]

✓ - High Priority Action

*Estimated Cost of Implementation—Source
Reduction: Toxics*

Table 715 -04(1) summarizes the estimated costs associated with the implementation of this chapter's recommendations. The major initial costs incurred by implementation of Element I (Comprehensive Regulation of Toxics) include hiring a Massachusetts Pretreatment Coordinator, development and distribution of a consolidated waste minimization report form, and providing technical assistance to dischargers in the completion of the waste minimization report. Coordination and training costs are to be spread over the five-year period. Element IB (WWTFs; Direct Dischargers) focuses on regulations of municipal and industrial dischargers. Major actions include a metals wasteload allocation for the Blackstone, Seekonk, and Providence River basin at approximately \$700,000 (\$100,000 of this cost exclusive of monitoring conducted by the Narragansett Bay Project, has been provided by the EPA). Other major costs for this element include inspection and enforcement. One possible major cost associated with meeting more stringent limits on toxics is the upgrading of the Upper Blackstone Water Pollution Abatement District (UBWPAD) facilities; UBWPAD estimates that, based on a Camp, Dresser, and McKee analysis (which is not an engineering study), the cost of WWTF upgrade necessary to meet such limits (possibly utilizing reverse osmosis technology) could be as high as \$150 million. Element IC (Industrial Users) includes a recommendation requiring that waste reduction, reclamation, and recycling plans submitted by industrial users be certified by a Professional Engineer; this could result in additional costs to the private sector. Other private costs could result from the recommended requirement that industries implement alternative waste reduction technologies.

Element ID (Other Generators) includes provisions for the expansion of the Industrial Pretreatment program, an action that would require WWTFs to obtain additional personnel for permitting and enforcement (increased fees could cover additional costs). Additionally, this element recommends that

the RIDEM Household Hazardous Waste Collection Program be expanded to include "tiny quantity" commercial and industrial waste generators. This recommendation was not costed since it is expected to operate on a cost-recovery basis. Another recommendation from this section that could operate on a cost-recovery basis is the establishment (in both Rhode Island and Massachusetts) of a stringent auto inspection program for air emissions and fluid leaks. It should be noted that the success of cost-recovery programs can be limited by political opposition, the ability of those affected to pay, and the concerns that the institution of fees could put certain industries at a competitive disadvantage. Major costs in Element IE (Economic Incentives) include annual costs associated with promoting source reduction and providing technical assistance to industries in the Bay basin. The fiscal impacts of providing economic incentives cannot be determined until such measures are specifically designed. Additionally, this chapter recommends that imported manufactured goods be required to meet the same federal and state production standards as locally-produced goods; it is possible that this action could raise the cost of some goods to consumers. Element IF (Information Exchange) contains a recommendation that the HWRP establish a Technology Review Board; it is intended that members will serve on a voluntary basis.

Elements II and III (Metals and Toxic Organics) include recommendations that standardized effluent limits for certain metals and organics, based on the most stringent limits currently in use, be applied to specific industry categories. It is possible that this requirement could result in additional costs to some industrial dischargers. Also, a recommended requirement that water suppliers reduce copper and lead concentrations within their conveyance systems could place significant financial burdens on these suppliers.

Element IV (PAHs and PHCs) contains a recommendation that state departments of transportation support research into the design of BMPs to treat road runoff; a possible existing source of funding for this is the funding available from the 1991 Internal

Surface Transportation Efficiency Act. Funding resulting from this act is providing \$13 million to Rhode Island for nonpoint source pollution abatement projects on the Pawtuxet River; a non-federal match of \$3.6 million is required.

The remaining elements contain actions geared toward the setting of effluent limits, the development of water quality criteria, efforts to prevent or reduce petroleum inputs to the Bay, and a survey of pesticide use in the watershed.

WWTFs, RIDEM, and MADEP are the primary implementing authorities. These agencies would need to coordinate many of the *CCMP* implementation activities with the EPA.

For further details regarding the *CCMP* cost estimation process and funding strategies, refer to the *Narragansett Bay CCMP Cost Estimation and Funding Report* (Apogee Research Inc./NBP, 1992).

Table 715-04(1)

**ESTIMATED COST OF IMPLEMENTATION
SOURCE REDUCTION: TOXICS**

**COST ESTIMATES BY
ELEMENT**

	92-93		93-94		94-95		95-96		96-97		Total 92-97	
	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other
IA-Comprehensive Regulation	162,500	5,000	90,000	5,000	90,000	5,000	90,000	5,000	90,000	5,000	522,500	25,000
IB-WWTFs; Direct Dischargers	65,000	0	212,500	0	323,500	1,046,000	323,500	346,000	323,500	346,000	1,248,000	1,738,000
IC-Industrial Users	82,500	0	45,000	0	45,000	0	45,000	0	45,000	0	262,500	0
ID-Other Generators	298,750	6,000	265,000	6,000	292,500	6,000	277,500	21,000	277,500	21,000	1,411,250	60,000
IE-Economic Incentives	423,750	24,000	70,000	24,000	80,000	24,000	80,000	24,000	80,000	24,000	733,750	120,000
IF-Information Exchange	0	0	0	0	0	0	0	0	0	0	0	0
IG-Treatment	25,000	0	0	0	0	0	0	0	0	0	25,000	0
II-Metals and Cyanide	175,000	0	15,000	0	65,000	0	15,000	0	15,000	0	285,000	0
III-Toxic Organics	0	0	0	0	0	0	0	0	0	0	0	0
IV-PAHs and PHCs	62,500	720,000	10,000	720,000	10,000	720,000	10,000	720,000	10,000	720,000	102,500	3,600,000
V-Pesticides and Herbicides	237,500	0	12,500	0	12,500	0	12,500	0	12,500	0	287,500	0
		0		0				0				
TOTALS	1,532,500	755,000	720,000	755,000	918,500	1,801,000	853,500	1,116,000	853,500	1,116,000	4,878,000	5,543,000
TOTAL BY YEAR		2,287,500		1,475,000		2,719,500		1,969,500		1,969,500		10,421,000

**COST ESTIMATES BY
AGENCY**

	92-93		93-94		94-95		95-96		96-97		Total 92-97	
	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other
RIDEM	736,250	23,000	305,000	23,000	265,000	513,000	235,000	23,000	235,000	23,000	1,776,250	605,000
RIDOH	0	0	0	0	12,500	0	0	0	0	0	12,500	0
URI	12,500	0	12,500	0	12,500	0	12,500	0	12,500	0	62,500	0
RI Legislature	3,750	0	0	0	0	0	0	0	0	0	3,750	0
RIDOT	0	720,000	0	720,000		720,000	0	720,000	0	720,000	0	3,600,000
MADEP	306,250	12,000	142,500	12,000	140,000	222,000	122,500	12,000	122,500	12,000	833,750	270,000
MADPH	0	0	0	0	12,500	0	0	0	0	0	12,500	0
MA Legislature	3,750	0	0	0	0	0	0	0	0	0	3,750	0
WWTFs	470,000	0	260,000	0	476,000	346,000	483,500	361,000	483,500	361,000	2,173,000	1,068,000
TOTALS	1,532,500	755,000	720,000	755,000	918,500	1,801,000	853,500	1,116,000	853,500	1,116,000	4,878,000	5,543,000
TOTAL BY YEAR		2,287,500		1,475,000		2,719,500		1,969,500		1,969,500		10,421,000